Remarks

Support for the Amendments

Support for the foregoing amendments to claims 1, 5, 6 and 20, and for new claims 21-29 can be found throughout the specification and in the claims as originally filed. These amendments do not add new matter, and their entry and consideration are respectfully requested.

Status of the Claims

By the foregoing amendments, claims 2-4 and 10-19 have been canceled, claims 1, 5, 6 and 20 are sought to be amended, and new claims 21-29 are sought to be added. Upon entry of the foregoing amendments, claims 1, 5-9 and 20-29 are pending in the application, with claims 1 and 20 being the independent claims.

Summary of the Office Action

In the Office Action dated September 9, 2004, the Examiner has made eight rejections of the claims. Applicants respectfully offer the following remarks to traverse each of these elements of the Office Action. Applicants respectfully request reconsideration of the present Application.

Rejection Under 35 U.S.C. § 102(e) Over Lindstrom

In the Office Action at page 3, the Examiner has rejected claims 1, 3-6, 7, 8 and 14 under 35 U.S.C. § 102(e), as being anticipated by Lindström, C., U.S. Patent No. 6,773,493 (hereinafter "Lindström"). Applicants respectfully traverse this rejection. However, solely to expedite prosecution, and not in acquiescence to this rejection, claims

2-4 and 14 have been cancelled. Hence, the portion of this rejection that may have

applied to these claims has been rendered moot. Applicants also respectfully traverse

this rejection as it may apply to the remaining claims.

The Examiner asserts that Lindström discloses an apparatus comprising a

polytetrafluorethylene membrane on a support, a vacuum source and an analyzer. The

Examiner further asserts that the membrane allows gas to pass, but not liquid, and is in

fluid communication with a trap. The Examiner therefore concludes that Lindstrom

anticipates the present claims. Applicants respectfully disagree with this conclusion.

Applicants respectfully submit that Lindström does not disclose the use of a

heater for a semi-permeable membrane as recited in present claim 1 (and hence, claims

5-8 that depend ultimately therefrom). It is further noted that Lindström does not

disclose the use of a gas chromatograph in fluid communication with the permeate side

of a semi-permeable membrane, also as recited in present claim 1 (and hence the

dependent claims listed above).

Under 35 U.S.C. § 102, a claim can only be anticipated if every element in the

claim is expressly or inherently disclosed in a single prior art reference. Since Lindström

does not expressly or inherently disclose one or more elements of the presently claimed

invention, this reference cannot and does not anticipate claims 1 and 5-8. Therefore,

reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(e) over Lindström

are respectfully requested.

Rejection Under 35 U.S.C. § 103(a) Over Sjostrom, In View Of Hubbell, and Further In View Of Liang

In the Office Action at page 3, the Examiner has rejected claims 1-4, 8-10, 14 and 20 as being unpatentable over Sjostrom, S. et al., U.S. Patent No. 6,736,883 (hereinafter "Sjostrom") in view of Hubbell, J.M., et al., U.S. Patent No. 6,609,434 (hereinafter "Hubbell") and further in view of Liang, D.C., et al., U.S. Patent No. 5,062,708 (hereinafter "Liang"). Applicants respectfully traverse this rejection. However, solely to expedite prosecution, and not in acquiescence to this rejection, claims 2-4, 10 and 14 have been cancelled. Hence, the portion of this rejection that may have applied to these claims has been rendered moot. Applicants also respectfully traverse this rejection as it may apply to the remaining claims.

The Examiner asserts that Sjostrom discloses a system employing a filter with a support and heater, and sample extraction lines. The Examiner notes that the sampled mercury is then analyzed. The Examiner states that Sjostrom "does not refer to [a] vacuum, state that the porous metal is semi-permeable, and does not clearly state that the analyzer is in fluid communication with the filter." Office Action at page 3, fifth paragraph.

The Examiner sites the disclosure of Hubbell in order to provide support for the assertion that porous metal is a semi-permeable material. The Examiner further asserts that it would have been obvious to connect a gas chromatograph to the system of Sjostrom, because Liang discloses that a gas chromatograph may detect mercury. The Examiner further asserts that gas chromatographs employ a vacuum to pass samples. The Examiner therefore concludes that the present invention is rendered obvious. Applicants respectfully disagree with these assertions and the Examiner's conclusions.

Present claim 1 (and hence, claims 8 and 9 that depend ultimately therefrom) recites an apparatus for sampling gas phase molecules, comprising a semi-permeable, gas-permeable membrane, a support structure, a heater for the membrane, a vacuum source that generates a reduced pressure at the permeate side of the membrane and a gas chromatograph in fluid communication with the permeate side of the semi-permeable membrane.

Applicants respectfully submit that Sjostrom is deficient as a primary reference for several reasons. As the Examiner has noted, Sjostrom does not disclose the use of a semi-permeable membrane, the use of a vacuum source, or the use of a gas chromatograph to analyze the gas phase molecules. Applicants respectfully submit that these serious deficiencies in Sjostrom cannot be cured by the disclosures of Hubbell or Liang, alone, or in combination.

With regard to the use of a semi-permeable membrane, Applicants respectfully submit that while a porous metal membrane can be semi-permeable, the porous metal membrane disclosed in Sjostrom and described in Hubble are not semi-permeable membranes as that term is used in the specification and present claims. Applicants respectfully submit that the ordinarily skilled artisan would readily understand that the term "semi-permeable membrane," as it relates to membranes for use in the present invention, means that the membranes will not permit bulk flow of liquids or solids, but rather only allow flow of gas-phase molecules. *See* Specification at page 11, paragraph 31, lines 8-10. Applicants note that the "semi-permeable" porous metal membranes of Hubbell actually require the transport of water and exclude the transport of gas-phase molecules. "Also, the semi-permeable member has pores sized to transmit water but

exclude air transport across the member." Hubbell at column 12, lines 18-20. Therefore, the disclosure of Hubbell does not provide support for the Examiner's conclusion that the filter disclosed in Sjostrom is a "semi-permeable membrane," as that term is used in the

present claims and specification.

With regard to the Examiner's assertion that it would have been obvious to connect a gas chromatograph to the system of Sjostrom because Liang discloses that a gas chromatograph may detect mercury, Applicants respectfully submit that the Examiner has not provided any motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to make such a combination. Sjostrom discloses using the system with a mercury analyzer or manual mercury measurement system. There is no mention of using the system in conjunction with a gas chromatograph. Simply the fact that Liang lists a reference on its face page with the title "Alternating Current Plasma Detector for Selective Mercury Detection in Gas Chromatograph," does not provide motivation to use a gas chromatograph in conjunction with Sjostrom's system. The ordinarily skilled artisan would not be motivated to combine the disclosure Sjostrom with that of Liang. A disclosure simply indicating that a gas chromatograph can be used to detect mercury does not suggest that such an analysis device could or should be used in conjunction with Sjostrom's system. Hence, the Examiner has not met the burden of establishing a prima facie case of obviousness.

Finally, Applicants respectfully submit that the Examiner's assertion that gas chromatographs employ vacuums to pass samples does not provide sufficient motivation to utilize a vacuum source in conjunction with the system of Sjostrom, much less a

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vacuum source that generates a reduced pressure at the permeate side of a semipermeable membrane as recited in present claim 1. The Examiner has not provided any
support for the assertion that gas chromatographs typically employ vacuums in their
operation. In fact, Applicants respectfully submit that gas chromatographs typically do
not utilize vacuums to pass samples, and hence, the Examiner has not provided sufficient
motivation to utilize a gas chromatograph, or a vacuum source, in conjunction with the
system of Sjostrom.

Furthermore, Applicants respectfully submit that Sjostrom, alone or in combination with Hubbell and/or Liang, does not disclose a method for sampling gas phase molecules of a sample, comprising placing a semi-permeable, gas-permeable, heated membrane having a permeate side and a sample side in fluid communication with the sample, generating a reduced pressure on the permeate side of the gas-permeable membrane with a vacuum pump to draw the gas phase molecules from the sample through the gas-permeable membrane to the permeate side and then to a sample loop and analyzing the gas phase molecules in a gas chromatograph, wherein the gas chromatograph is in fluid communication with the sample loop, as recited in present claim 20. As discussed above, Sjostrom does not disclose the use of a semi-permeable membrane as that term is used in the present specification and claims. Furthermore, Sjostrom does not disclose the use of a vacuum source (or pump), or a gas chromatograph to sample the gas phase molecules. As discussed above, these serious deficiencies in Sjostrom are not cured by the disclosures of Hubbell or Liang, alone or in combination.

In view of the foregoing remarks, Applicants respectfully submit that a *prima* facie case of obviousness has not been established based on the disclosures of Sjostrom, Hubbell and Liang, alone, or in combination. Reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

Rejection Under 35 U.S.C. § 103(a) Over Traina '432, In View of Chobotov and Further In View Of Hubbell

In the Office Action at pages 3-4, the Examiner has rejected claims 1-4, 7-10, 13, 14 and 20 as being unpatentable over Traina, J.E. *et al.*, U.S. Patent No. 5,297,432 (hereinafter "Traina '432"), in view of Chobotov, M.V., *et al.*, U.S. Patent No. 6,776,604 (hereinafter "Chobotov") and further in view of Hubbell. Applicants respectfully traverse this rejection. However, solely to expedite prosecution, and not in acquiescence to this rejection, claims 2-4, 10, 13 and 14 have been cancelled. Hence, the portion of this rejection that may have applied to these claims has been rendered moot. Applicants also respectfully traverse this rejection as it may apply to the remaining claims.

The Examiner asserts that Traina '432 discloses an apparatus, including a heated sintered metal filter, through which a sample is drawn via a pump, then passed through a chiller and an analyzer. The Examiner notes that Traina '432 does not disclose that the filter is a semi-permeable membrane. The Examiner relies on the disclosures of Chobotov and Hubbell to cure this deficiency, noting that Chovotov discloses that sintered metal is porous, and that Hubbell discloses that porous metal is semi-permeable. The Examiner further asserts that, as Traina '432's analyzer is schematic in nature, it would have been obvious to apply a gas chromatograph with sample loops for analysis. Applicants respectfully disagree with these assertions.

As discussed above, the ordinarily skilled artisan would readily understand that the term "semi-permeable" as it is used in the specification and present claims refers to a membrane that does not permit bulk flow of liquids or solids, but only allows flow of gas-phase molecules. The sintered metal filter disclosed in Traina '432, as well as the porous metal in Hubbell, clearly are not semi-permeable membranes, as that term is used in the present claims. *See* Traina '432 at column 3, lines 20-23, "exposed to high levels of acidic gases and to the fine particulates which permeate course filter 24." *See also*, Hubbell at column 12, lines 18-20, "[a]lso, the semi-permeable member has pores sized to transmit water but exclude air transport across the member."

With regard to the Examiner's assertion that it would have been obvious to employ a gas chromatograph for use in the system of Traina '432, the Examiner has provided no motivation based on Traina '432, or other cited reference, or knowledge generally available in the art, to make such a modification. Simply the fact that the system of Traina '432 could be used in combination with a gas chromatograph, absent more, is not a showing sufficient to meet the burden required to establish a *prima facie* case of obviousness. Applicants further note that Traina '432 is non-analogous art, related to sampling exhaust gases from flues and stacks, rather than an apparatus and methods for sampling gas phase molecules at or below the surface of a soil or liquid sample site, which is the subject matter of the present invention. Therefore, Applicants submit that Traina '432 may not form the basis of an obviousness rejection under 35 U.S.C. § 103(a).

In view of the foregoing remarks, Applicants respectfully submit that a *prima* facie case of obviousness has not been established based on the disclosures of Traina

'432, Chobotov and Hubbell, alone, or in combination. Reconsideration and withdrawal

of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

Rejection Under 35 U.S.C. § 102(b) Over Long

In the Office Action at page 4, the Examiner has rejected claims 1, 3-6, 8 and 14

under 35 U.S.C. § 102(b), as being anticipated by Long, S.E. et al., U.S. Patent

No. 5,054,328 (hereinafter "Long"). Applicants respectfully traverse this rejection.

However, solely to expedite prosecution, and not in acquiescence to this rejection, claims

3-4 and 14 have been cancelled. Hence, the portion of this rejection that may have

applied to these claims has been rendered moot. Applicants also respectfully traverse

this rejection as it may apply to the remaining claims.

The Examiner asserts that Long discloses an apparatus which utilizes a PTFE

membrane, a vacuum source and an analyzer. The Examiner therefore concludes that

Long anticipates the present claims. Applicants respectfully disagree with these

assertions and this conclusion.

Applicants note that Long does not disclose the use of a vacuum source that

generates a reduced pressure at the permeate side of a semi-permeable membrane, as

recited in present claim 1. Long instead relies on diffusion of gas through the membrane

(see Long at column 2, lines 6-11). Furthermore, Long does not disclose the use of a

heater and Long does not disclose the use of a gas chromatograph in fluid

communication with the permeate side of the semi-permeable membrane as recited in

present claim 1. Therefore, Long does not disclose every element of the presently

claimed invention, and hence, cannot and does not anticipate claims 1, 5, 6 and 8.

Therefore, reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b) over

Long are respectfully requested.

Rejection Under 35 U.S.C. § 103(a) Over Long

In the Office Action at page 4, the Examiner has rejected claims 4 and 9 under

35 U.S.C. § 103(a), as being unpatentable over Long. Applicants respectfully traverse

this rejection. However, solely to expedite prosecution, and not in acquiescence to this

rejection, claim 4 has been canceled. Hence, the portion of this rejection that may have

applied to this claim has been rendered moot. Applicants also respectfully traverse this

rejection as it may apply to claim 9.

The Examiner asserts that it would have been obvious to employ a gas

chromatograph for an analyzer in the system of Long because Long discloses that gas

chromatographs successfully sense gases of interest, and further that gas chromatographs

commonly employ sample valves with loops to provide a predetermined volume sample

for analysis. The Examiner therefore concludes that Long renders the present invention

obvious. Applicants respectfully disagree with this conclusion.

As noted above, Long does not disclose the use of a vacuum source as recited in

present claim 1 (and hence, claim 9 that depends ultimately therefrom). Furthermore,

Long does not disclose the use of a heater for the semi-permeable membrane. Hence,

Long does not render obvious the presently claimed invention, as Long does not disclose

or suggest all of the claim limitations. The Examiner has provided no reference, nor

provided any indication of knowledge generally available to the ordinarily skilled

artisan, to cure these deficiencies in Long. Hence, a prima facie case of obviousness has

not been established based on the disclosure of Long. Reconsideration and withdrawal

of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

Rejection Under 35 U.S.C. § 103(a) Over Springmann, In View of Traina '010 and

Further In View Of Long

In the Office Action at page 5, the Examiner has rejected claims 1-14 and 20 as

being unpatentable over Springmann, T., U.S. Patent No. 6,022,510 (hereinafter

"Springmann"), in view of Traina, J.E. et al., U.S. Patent No. 5,458,010 (hereinafter

"Traina '010") and further in view of Long. Applicants respectfully traverse this

rejection. However, solely to expedite prosecution, and not in acquiescence to this

rejection, claims 2-4 and 10-14 have been cancelled. Hence, the portion of this rejection

that may have applied to these claims has been rendered moot. Applicants also

respectfully traverse this rejection as it may apply to the remaining claims.

The Examiner asserts that Springmann discloses a system, including a vacuum

system to draw a sample though a heated line, though a trap and then on to an analysis

apparatus. The Examiner notes that a filter, that may also be heated, is connected

between the probe and the heated line. The Examiner notes that Springmann does not

disclose that the filter is a semi-permeable membrane or that the analyzer is a gas

chromatograph.

The Examiner relies on the disclosure of Traina '010 to support the assertion that

a Teflon filter could be used in place of Springmann's filter because Traina '010 discloses

that a Teflon filter will satisfactorily collect moisture and prevent particulates from

entering into the sample channel of a flue probe. The Examiner also relies on the

disclosure of Long to support the assertion that the analyzer of Springmann could

employ a gas chromatograph, because Long discloses that gas chromatographs accurately sense gas concentrations, and further notes that gas chromatographs commonly employ sample valves with loops to inject columns. The Examiner therefore concludes that the presently claimed invention is rendered obvious. Applicants respectfully disagree with this conclusion and the assertions on which it is based.

Applicants respectfully submit that Springmann does not disclose the use of a vacuum source that generates a reduced pressure at the permeate side of a semipermeable membrane as recited in present claim 1 (and hence, the claims that depend ultimately therefrom), nor does Springmann disclose generating a reduced pressure on the permeate side of a gas-permeable membrane with a vacuum pump to draw gas phase molecules from the sample through the gas-permeable membrane to the permeate side and then to a sample loop, as recited in present claim 20. The disclosure of Springmann relies on feeding gas from a gas-sampling probe to the filter element disclosed in See Springmann at column 3, lines 15-17. The Examiner cites the Springmann. statement in Springmann that "flue gas is sucked in by means of a probe and fed to an analysis apparatus," in order to support the conclusion that Springmann discloses a vacuum source. See Office Action at page 5, second paragraph; Springmann at column 1, lines 10-11. Applicants respectfully submit that, even assuming that a vacuum source was used in a gas-sampling probe, this vacuum source would be on the sample side of the filter element, rather than on the permeate side of the filter (membrane) as required in the present claims. The Examiner's attention is directed to Figure 1 of Springmann, and to Springmann at column 3, lines 13-21, which states:

At its front end the closure plug 12 also has a connecting nipple 127, to which a gas-sampling probe can be attached in a manner not shown here.

Feeding of the flue gas to the filter element 11 is achieved via guide ducts 128, 129, which are provided in the form of holes in the closure plug 12. Thus, the flue gas enters the guide duct 128 axially and is passed through the radially directed guide duct 129 into the intermediate space between the filter housing 10 and the filter element 11.

Hence, viewing Figure 1, the gas-sampling probe (and thus any vacuum source that might be associated with it) are "upstream" of the filter element, and thus positioned at the "sample" side of the filter. Therefore, a reduced pressure would not be generated at the "permeate" side of the filter element (i.e., downstream of the filter, towards any analysis device) as in the presently claimed invention, but rather at the "sample" side of the filter. Applicants respectfully submit that Springmann therefore does not disclose all of the limitations of the present claims, and is therefore deficient as a primary reference on which to base a *prima facie* case of obviousness. The Examiner has not provided any citation or referenced any knowledge generally available to one of ordinary skill in the art that would cure this deficiency.

With regard to the Examiner's assertion that the filter element used in Springmann could be replaced with the Teflon filter disclosed in Traina '010, Applicants respectfully submit that ordinarily skilled artisan would have found no motivation in the disclosure of these references, or in the knowledge generally available in the art, to make such a substitution. Springmann discloses the use of a filter element for removing dirt and dust particles. *See* Springmann at column 2, lines 35-37. The disclosure of Springmann indicates that, because both the particle filter and the measured-gas line are heated, the temperature of the flue gas can be maintained above the dew point, thereby eliminating formation of any condensation on the particulate filer. *See* Springmann at column 1, lines 32-55.